schwartzsilver

Feasibility Study

Town Hall Annex

Town of Wellesley

12 SEPTEMBER 2019

Contents

Section A Executive Summary

Section B Existing Conditions

Site Description B1
Traffic Flow B2
Geotechnical Investigation B3
Environmental Investigation B4

Section C Programming

Program Verification C1
Permanent Program C1
Swing Program C2

Section D Conceptual Design Approach

Goal D1
Initial Site Concepts D1
Core, Structure, and Massing Concepts D4
Initial Site Massing Studies D5
Site Stakeholder Input D6
Program Test Fit D8
Program Plans D9
Material and Elevation Concepts D15
Model Images D16
Material Precedent D18

Section E Sustainability Approach

Net Zero E1
Mass Timber E3

Section F Cost and Schedule

Conceptual Construction Cost Summary F1
Project Cost F3
Project Schedule F4

Section X Appendices

Program Summaries X1
Program Reference Documents X2
Site Concepts with Traffic Flow X3
Architectural Plans with Phase Reconfiguration X4
Net Zero Financial Report X5
Mass Timber Presentation X6
Full Cost Estimate X7
Geotechnical Report X8
Environmental Report X9
Meeting Minutes X10

Executive Summary

A

Executive Summary

Goals

The primary purpose of this study is to test the feasibility of a site at Municipal Way to host a right-sized office building, the Wellesley Town Hall Annex, and to provide a working conceptual design and cost estimate for presentation at Annual Town Meeting in Spring 2020. Schwartz/Silver (SSA) has confirmed that the assumptions of McGinley Kalsow & Associates (MKA) regarding overall building square footage are correct and workable, and that a new structure to house the town departments not returning to Town Hall can be constructed in the general location of a municipal building demolished in 2014 while resolving the primary site challenges of circulation and safety.

The new building will pursue Wellesley's guidelines for sustainability, which call for a net-zero ready building. In addition the design team is investigating the use of a wood structure. The resulting conceptual design goes beyond these goals in proposing a net-zero building with a carbon-negative heavy-timber frame structure.

Program

The earlier study of the Town Hall renovation by MKA identified and sized departments that should not return to the Town Hall after renovation, and instead should reside permanently in the Town Hall Annex. This permanent 13,500 SF program includes the Facilities Management Department (FMD), now in leased space; the Land Use Departments, currently located at the lower level of Town Hall; and a large multi-purpose meeting room space for up to 50 people. SSA verified the department sizes and found that a three-story 4,500 SF footprint per floor works well to house the FMD on the third floor, the Land Use Departments on the second floor, and the large meeting room space on the ground floor.

In addition to the permanent program, the Annex once built will house most of the current Town Hall departments in a temporary swing condition while the historic Town Hall is renovated. If FMD remains in their current leased space as planned, the third floor of the Annex will be available for departments that have limited or no public visitation, while the 1st floor meeting room can house departments that require public interaction.

Once the Town Hall renovation project is complete, the work required to change the swing space in the Annex to its permanent condition will involve minimal reconfiguration of only the first and third floors.

Conceptual Design

The main challenge of the conceptual design was to take the currently undefined site area between municipal buildings and define a site to house the 4,500 SF footprint without disrupting the day-to-day operations of the larger municipal campus. The Fire Department, Municipal Light Plant, and Department of Public Works are key stakeholders locate on the Municipal Way Campus. They have been engaged in the process by SSA and FMD, and have provided valuable insight into the traffic flow on the site. SSA recommends accommodating the new building by

making a peninsula of safe arrival space shared by both the existing cable building and the Annex entrance. The non-vehicular space between both buildings will thus be out of the flow of municipal vehicle traffic.

The irregular form of the proposed Annex on the resulting peninsula will allow traffic to flow smoothly around the building with adjacent 16 accessible and public parking spaces. SSA also tested the building form with the preferred program distribution and provided program planning and conceptual architectural plans for both permanent and swing conditions described later in this report.

In addition to the limited adjacent parking, the remote lot, designed as an extension of the DPW lot, offers 53 parking spaces and is a reasonable walking distance (approx. 300 feet) from the Annex along a safe path.

Subsurface Investigation

Recent nearby buildings constructed on the municipal campus required foundation solutions beyond simple spread footings to deal with subsurface conditions. Borings performed on the building site as part of this study showed that compaction of existing soils would allow the use of standard spread footings. The full geotechnical report can be found in the appendices.

The remote parking lot site is within an AUL (Activity and Use limitation). Review of the Department of Environmental Protection file and testing of the subsurface soils confirmed that construction of the parking lot will not violate the requirements of the AUL. The full environmental report can be found in the appendices.

Sustainability

The Town's stated goal of a Net Zero Energy building is achievable with a three-story 13,500 total square foot building. The PV panels required may extend beyond the roof's 4,500 SF footprint. The conceptual design model shows a level of PVs supported by a frame above the roof level, allowing mechanical units on the roof below. The cost estimate includes NZ Energy, NZ Ready, and base-level code options for mechanical systems and envelopes.

In addition to minimizing, or zeroing out, energy usage, SSA recommends using a cross-laminated timber (CLT) slab and glue-lam beam and column structure to support the building. This modern heavy timber wood structural system would help the building achieve lower carbon embodiment through "carbon sequestration."

Cost

The conceptual design cost estimate for the building is estimated at $8,475,513. This includes the full Net Zero Energy systems and envelope, site development costs with remote parking, escalation, and contingency.

The total project design cost (hard and soft) is estimated to be $1,261,437.
The total project construction cost (hard and soft) is estimated to be $10,689,966.
The total project cost (hard and soft) is estimated to be $11,951,403.

Acknowledgements

Schwartz Silver would like to thank the following people for participation and guidance during the study:

Town Hall Annex Working Group

Brian Dupont, IT Director
Marjorie Freiman, Chair, Board of Selectmen
Steve Gagosian, FMD Design and Construction Manager
Meghan Jop, Executive Director
Kevin Kennedy, FMD Project Manager
Joe McDonough, FMD Director of Facilities

Municipal Way Stakeholders

Kevin Bracken, MLP Assistant Superintendent
David Cohen, DPW Director
Rick Delorie, WFD Fire Chief
David Hickey, DPW Engineer
Don Newell, MLP Assistant Director
Jeff Peterson, WFD Assistant Chief

SSA Consulting Team

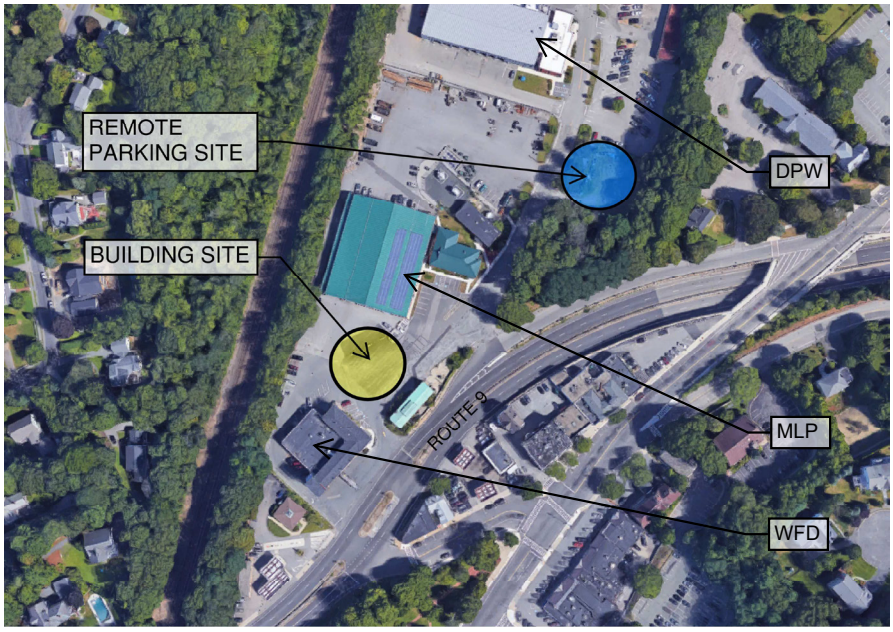
ARUP Engineers, MEP, FP
Becker Structural Engineers/
Thornton Tomasetti, Stuctural
Maclay Architects, Sustainability
McPhail, Geotechnical
Nitsch Engineering, Traffic, Civil
PEER Consultants, Environmental

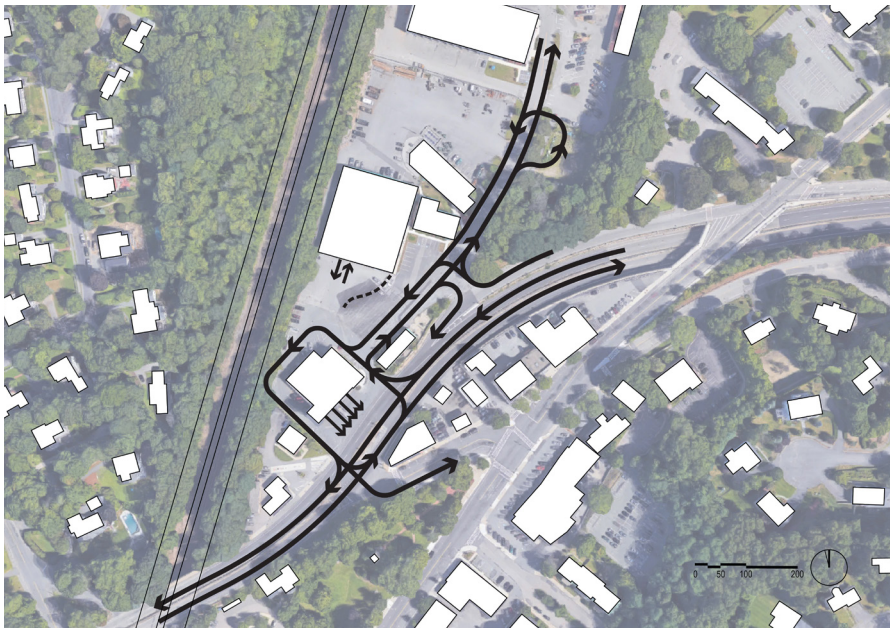
Existing Conditions

The current site at Municipal Way is an undefined, open asphalt patch between the Fire Station (WFD) and the Municipal Light Plant (MLP). Traffic with many large vehicles from the MLP, WFD and Department of Public Works (DPW) crosses the site with no identified traffic markings or signage. It is vital that the siting of the proposed Annex not affect onging operations, but offer a safe arrival for staff and visitors.

In addition to the building site, the municipal campus has an undeveloped site for remote parking for the Annex. This new lot will essentially be an extension of the DPW's employee parking lot. It is within a reasonable distance of the Annex building (approximately 300 feet) as long as a clear and safe passage for pedestrians can be developed between the lot and the Annex, considering the type of industrial traffic typical of Municipal Way. There must also be adequate room immediately adjacent to the Annex to provide accesible spaces, and additional spaces for public visitors.

Until 2014, the site included a two-story administrative building built in the 1950s. This building is the initial precedent for the site's abililty to host an office building of around 4,500sf. However, the MLP garage was built close to it, understanding that the admin building would be demolished in the future. The proposed Annex can not be sited in the exact location of the previous admin building.

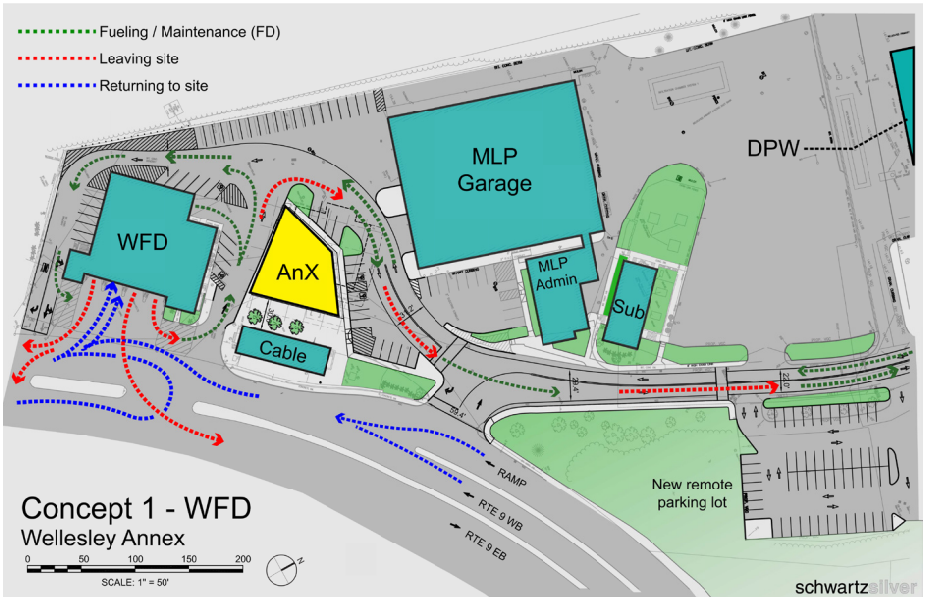




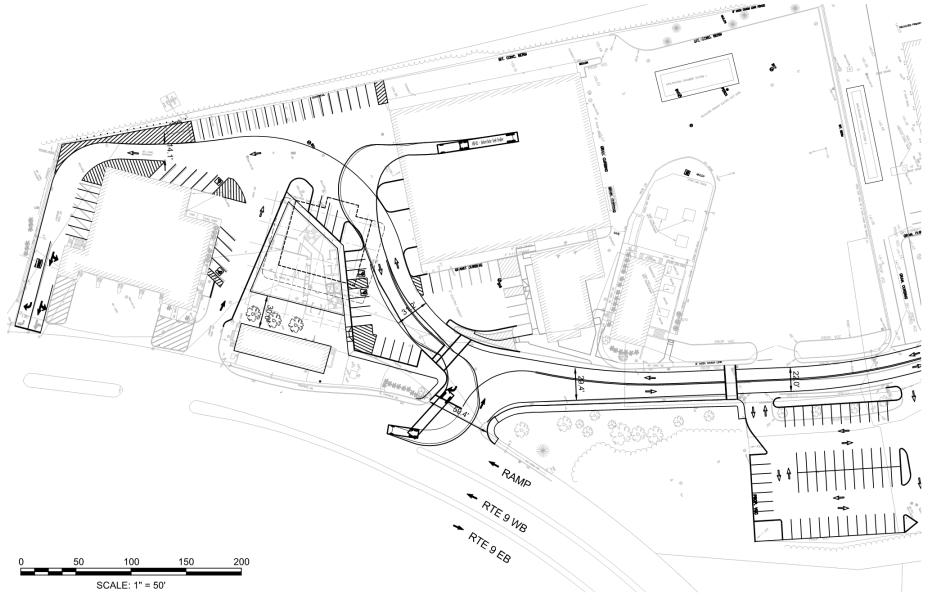
Traffic Flow

Because unimpeded site circulation is the major consideration for success of siting the proposed Annex, Schwartz Silver and their consulants Nitsch Engineering met with the site stakeholders (WFD, FMD, and DPW) to understand how they currently use the site. This meant understanding preferred paths for vehicles exiting and returning to the campus, as well as internal circulation for vehicular maintenance and fueling. Understanding existing and proposed vehicular patterns was also necessary to understand how to safely mix in staff and public vehicles accessing the Annex.

The site concepts 1 & 2 (Section D) include vehicular flow diagrams for each stakeholder. The diagrams illustrate campus egress and access, and intra-campus travel for fueling and maintenance. In addition, each department produced a list of their largest vehicles circulating on the site. The largest vehicles were tested in turning radius software to inform the layout of the concepts. Traffic flow and turning radius diagrams are included in the appendices and on the following page B3.



Sample Traffic Flow Diagram



Sample Vehicle Turning Diagram

Geotechnical Investigations

A geotechnical investigation was undertaken by the study team to understand both the building site and the parking site subsurface conditions. Five borings were taken over the course of one day, three at the building site, and two at the parking site.

Soil conditions at recently constructed Municipal Way buildings for the MLP and DPW required the use of rammed aggregate pier foundations to support the structures above. However, the current borings at the proposed Annex building site show that subsurface conditions are adequate to allow the use of spread footings on either glacial outwash or on new structural fill. Alternatively, lean concrete may be used to minimize the excavation required for structural fill. More costly solutions, such as rammed aggregate piers, will not be required.

The bearing stratum on the building site will not be subject to liquifaction during an earthquake.

Groundwater is not likely to appear during excavation, but conditions will require control during construction to maintain a firm subgrade for construction traffic.

Borings at the remote parking site encountered 10 feet of fill over glacial outwash. The existing fill can be partially excavated and then compacted for the new vehicular paving and base course.

McPhail's full geotechnical report is in the appendices.

Environmental Investigations

The remote parking site is within a larger Activity and Use Limitation (AUL). The AUL was established by the Department of Environmental Protection during the construction of the Municipal Light Plant and Department of Public Works facilities in 2010 due to the presence of PCBs.

The AUL specifies acceptable activities on the site. Public and employee parking, sidewalks, and landscaping are acceptable uses and will not violate the terms of the AUL.

In addition, the AUL requires the production of a Health and Safety Plan, and a Soils Management plan for use during construction, an activity lasting more than three months.

No PCBs were detected during this subsurface investigation. Initial pre-characterization of soils found VOCs, SVOCs and TPHs. Based on these results, disposal of excess soil generated at the site during the period of development may include options such as landfill reuse, landfill disposal, and recycling. PEER recommends that during development, additional pre-characterization samples will need to be collected prior to the soils' transport to a reuse, disposal, or recycling facility.

The full environmental report including detected soil sample results can be found in the appendices.

Programming

Program Verification

For this study, Schwartz/Silver (SSA) reviewed McGinely Kalsow & Associates' (MKA) Town Hall Visioning and Space Utilization Study that helped quantify the Annex study. These documents provided adequate information to verify both the identified permanent departments for the Annex, and possible accommodation of departments temporarily while Town Hall is under construction. In addition, Schwartz/Silver (SSA) discussed space requirements with the Town Hall Annex Working Group, Facilities Management Department (FMD), and the IT Department, and toured the Land Use departments in Town Hall.

Documents used for program verification are as follows, and included in the appendices:

- MKA Program Narrative
- MKA Current Program Distribution Plans
- MKA Current Furniture Plans
- MKA Program Needs Worksheet
- MKA Program Options
- FMD Existing Office Furniture Plan

Permanent Program

The Permanent Program is the primary driver for understanding the required size of the Annex. The departments previously identified for residence in the Annex are as follows:

- Facilities Management Department (FMD)
- Building Department (BD)
- Natural Resources Commission (NRC)
- Planning Department (PLD)
- Zoning Board of Appeals (ZBA)

Including required shared meeting spaces, these departments require roughly 13,500 GSF, matching MKA's analysis of the needed Annex size.

Town goals of sustainability, and specifically Net Zero Energy (NZE), provide some early guidance as to how to distribute the program among floors. Simple building forms help achieve NZR (Ready) or NZE by minimizing the amount of envelope for a given gross square footage, and reducing opportunities for air infiltration. SSA assumed then that equal floor plates should be the goal of the program distribution.

FMD is the largest department, needing roughly 4,300 GSF. An Annex at three stories would allow FMD to have a floor of their own at 4,500 SF, including a permanent IT office. Four smaller floors would mean splitting FMD between multiple floors.

The Land Use Departments (BD, NRC, PLD, ZBA) fit together on one floor at roughly 4,500 GSF. The advantage of grouping them is the ability to consolidate and share resources: meeting rooms, public counter, waiting area, copy/ print, file, drawing and record storage. However, considering the larger core requirements (such as utility rooms) of the first floor, there is not

enough room for them on the first floor. Instead, they can reside together on the second floor. In the conceptual design (Section C), public access is made obvious by an open stair and elevator near the entry lobby, and arrival at the second floor to a consolidated counter and waiting area for all departments.

The remaining program, including a 50 person meeting/hearing room, server room, cable TV closet and entry lobby fit on the first floor with the larger core elements (mechanical/ electrical/ sprinkler room, trash/recycling). The large meeting/hearing room is able to be subdivided, and and can serve as a break room during the day.

The permanent program distribution is as follows:

PROGRAM DISTRIBUTION - Permanent Departments

	DEPARTMENT	ABBV.	COLOR	NSF	Circ MOD	GSF
1ST FLOOR	IT	IT		150	1.5	225
	General	GEN		2,054	1.5	3,081
	Core	C		1,126	1	1,126
	Total 1st Floor					**4,432**
2ND FLOOR	Building Department	BLD		683	1.5	1,025
	Natural Resources Commission	NRC		339	1.5	509
	Planning Department	PLD		483	1.5	725
	Zoning Board of Appeals	ZBA		162	1.5	243
	General	GEN		840	1.5	1,260
	Core	C		714	1	714
	Total 2nd Floor					**4,475**
3RD FLOOR	FMD	FMD		1,337	1.5	2,006
	IT	IT		184	1.5	276
	General	GEN		888	1.5	1,332
	Core	C		714	1	714
	Total 3rd Floor					**4,328**

The full permanent program summary is attached in the appendices.

Swing Program

The Annex Project has the ability to save significant costs by accomodating many departments at Town Hall which will be required to move during the major renovation.

If FMD remains in its leased space through the renovation at Town Hall as planned, their permanent space in the Annex is able to accommodate the bulk of the departments slated to return to Town Hall during renovation in a temporary capacity, with the exception of HR and Retirement.

As soon as the Annex is built, the Land Use Departments would move into the 2nd floor entirely and permanently. The other two floors are available to host temporary Town Hall departments.

The third floor (future FMD) can host administrative departments that work together and

receive limited outside visitation as follows:

Finance Department (FN)
IT (IT)
Selectman's Office (SO)

The 1st floor hearing room can host non-land use departments that require public visitation as follows, plus a shared meeting room:

Assessor's Office (AO)
Town Clerk (TC)
Treasurer/ Collector (TR)

Minimal reconfiguration is required to move from the swing phase to the permanent phase. Conceptual plans in Appendix illustrate extent of reconfiguration.

Departments not accommodated in the swing phase:

Custodian (CS)
Facilities Management Department (FMD)
Human Resources (HR)
Retirement (RT)
Sustainable Energy Commission (SEC)
Veterans Services (VS)
Youth Commission (YC)

Of these, CS, SEC, VS, and YC can be accommodated in other town spaces. Retirement and Human Resources will require a leased space of approximately 2000 sf. FMD will retain its current leased space during the renovation of Town Hall.

The swing department distribution is as follows:

PROGRAM DISTRIBUTION -Swing Departments

	DEPARTMENT	ABBV.	COLOR	NSF	Circ MOD	GSF
1ST FLOOR	*IT (SWING)*	*IT*		*150*	*1.5*	*225*
	Assessor's Office (SWING)	*AO*		*385*	*1.5*	*578*
	Town Clerk (SWING)	*TC*		*480*	*1.5*	*720*
	Treasurer/ Collector (SWING)	*TR*		*366*	*1.5*	*549*
	General	GEN		64	1.5	96
	General (SWING)	*GEN*		*860*	*1.5*	*1,290*
	Core	C		1,126	1	1,126
	Total 1st Floor					**4,584**
2ND FLOOR	Building Department	BLD		683	1.5	1,025
	Natural Resources Commission	NRC		468	1.5	702
	Planning Department	PLD		483	1.5	725
	Zoning Board of Appeals	ZBA		162	1.5	243
	General	GEN		840	1.5	1,260
	Core	C		714	1	714
	Total 2nd Floor					**4,668**

The full swing program summary is attached in the appendices.

3RD FLOOR	*Finance Department (SWING)*	*FD*		*678*	*1.5*	*1,017*
	IT (SWING)	*IT*		*502*	*1.5*	*753*
	Selectmans Office (SWING)	SO		474	*1.5*	*711*
	General	GEN		552	1.5	828
	General (SWING)	GEN		144	*1.5*	*216*
	Core	C		714	1	714
	Total 3rd Floor					**4,239**

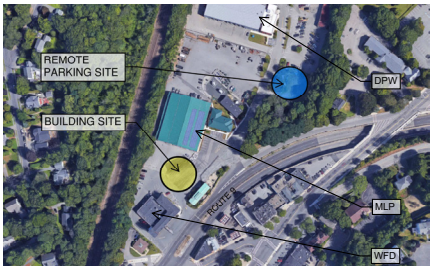
Conceptual Design Approach

D

Conceptual Design Approach

Goal

The primary challenge of the conceptual design of the Annex is to make a place for a new building, while maintaining the unimpeded operation of the larger site. The correct solution is not just workable, but offers an an opportunity to reorganize the most heavily used end of the municipal campus.



Municipal Way (off of RT. 9)

The current site at Municipal Way is an undefined, open asphalt patch between the Fire Station (WFD) and the Municipal Light Plant (MLP). Traffic from the MLP, WFD and Department of Public Works (DPW) crosses the site with no identified traffic markings or signage, and with many large vehicles. It is imperative that the siting of the Annex not affect onging operations, but offer a safe arrival for staff and visitors.

In addition to the building site, the municipal campus has an undeveloped site for a remote parking lot for the Annex. This new parking lot will essentially be an extension of the DPW's employee parking lot. It is within a reasonable distance of the Annex building (approximately 300 feet) as long as a clear and safe passage for pedestrians can be developed between the lot and the Annex, considering the type of industrial traffic typical of Municipal Way. There must also be adequate room immediately adjacent to the Annex to provide accesible spaces, and additional spaces for public visitors.

Initial Site Concepts

A now demolished administration building once sat close to the MLP garage, but the garage was located with the understanding that the administration building would be demolished at some point. SSA does not recommend siting the Annex in the exact location of the previous building.

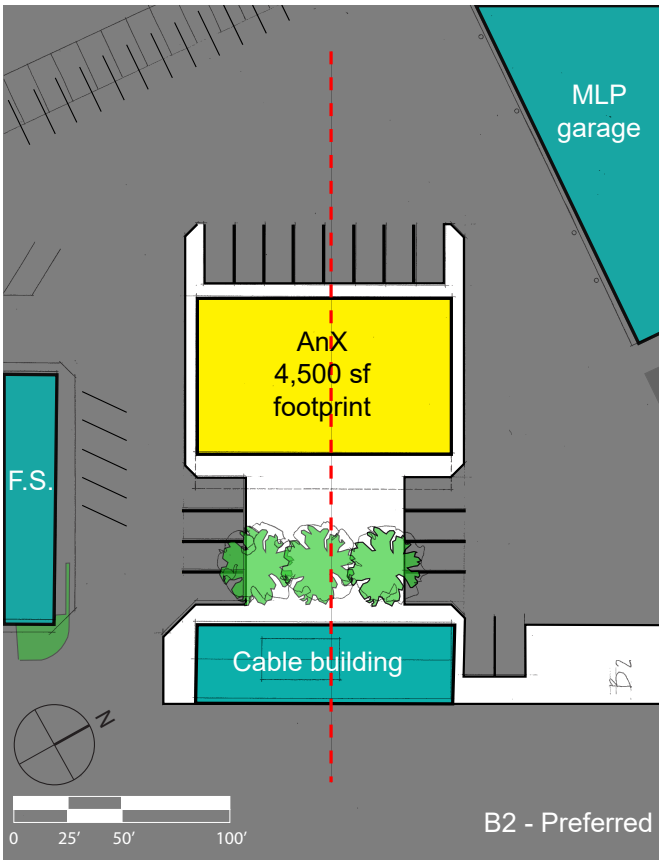
Instead, SSA's inital site concepts make a "peninsula" that extends from the Cable Building (facing Route 9) into the site, creating a shared plaza between the Cable Building and the Annex. The exterior space created would serve as a safe arrival point for Annex visitors by allowing the entrance of the Annex to be free of traffic conflicts.

The seven initial site concepts tested a variety of 4,500 SF footprint shapes on the peninsula, looking for a balance between the size of the arrival plaza, adequate adjacent parking, and room for traffic to flow between the peninsula and MLP building. Of the seven concepts presented, two were preferred by the working group as follows on the proceeding page.

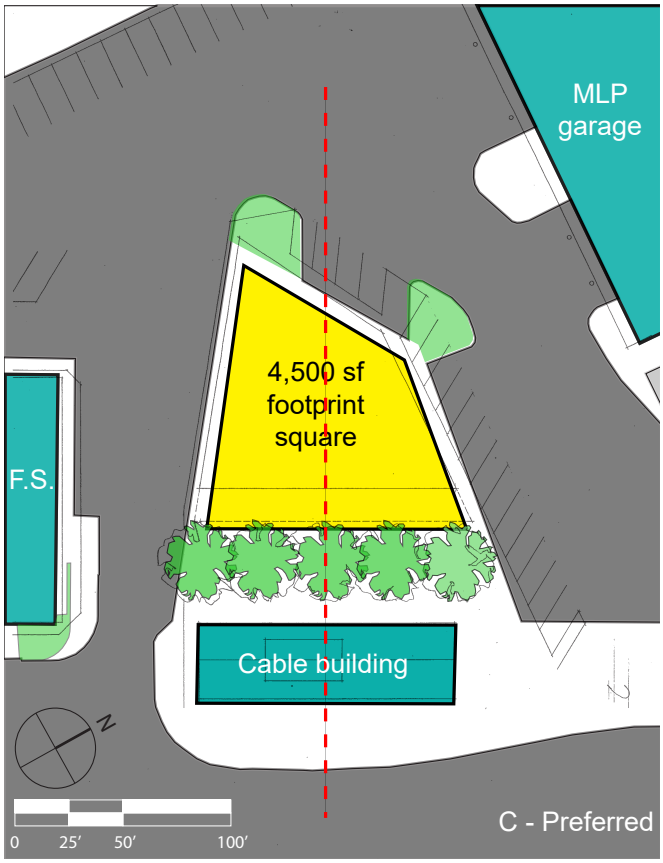
Option B2 shows a rectangular footprint while minimizing a pinch point for traffic between the new footprint and the MLP.

Option C shows an irregular footprint that aids traffic flow around the site and offers more adjacent parking.

Initial Preferred Site Concepts

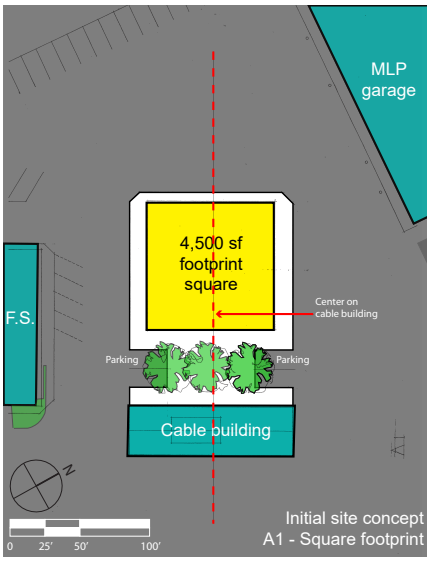


Concept B2

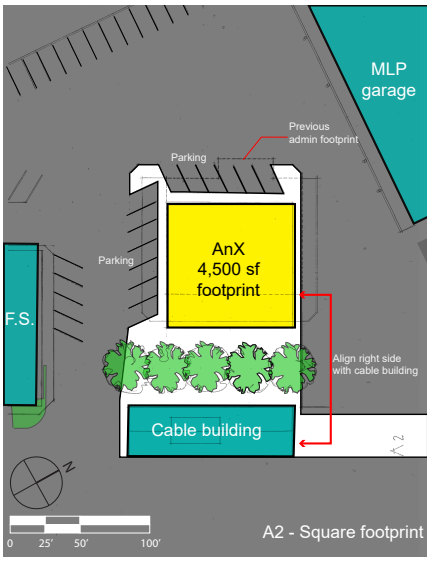


Concept C

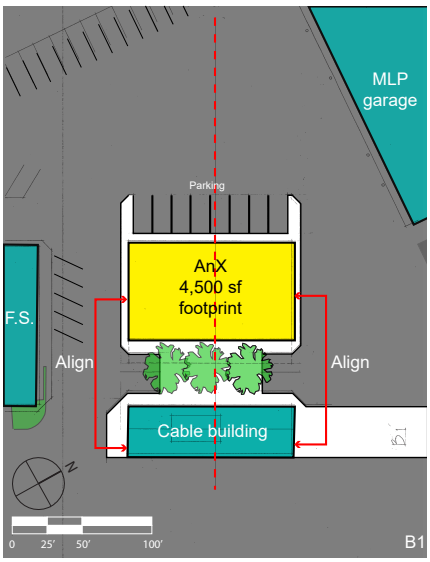
Initial Site Concepts
Considered But Not Selected



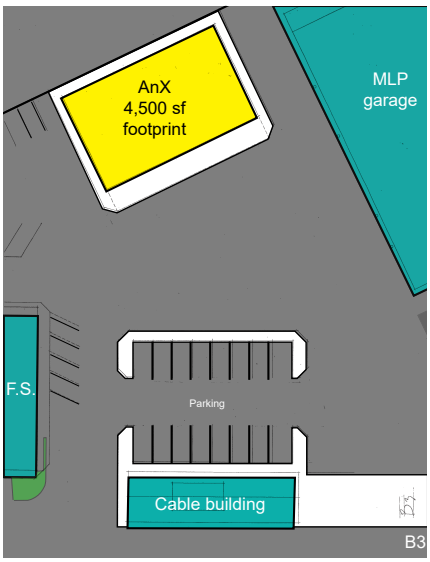
Concept A1



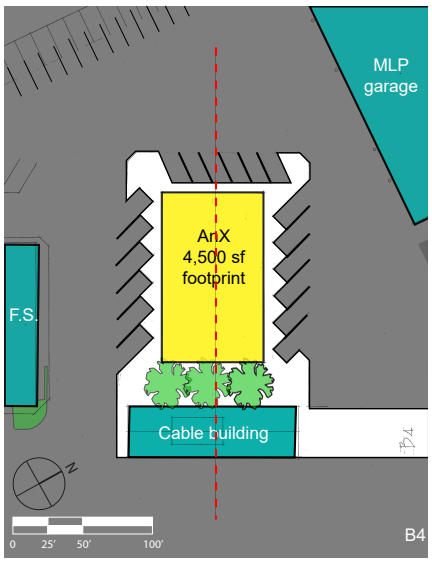
Concept A2



Concept B1



Concept B3



Concept B4

Core, Structure and Massing Concepts

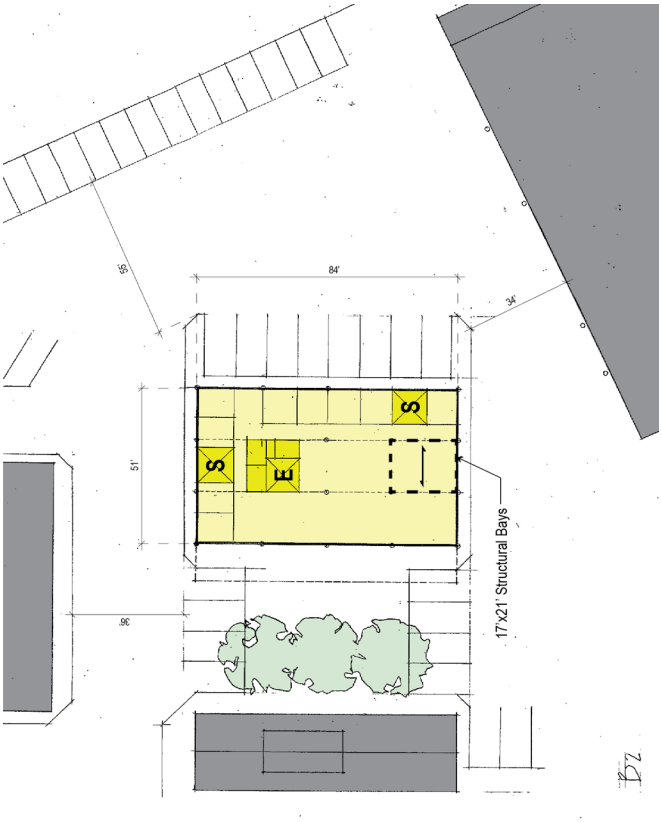
With preferred initial site concepts, SSA tested the schemes with structure and potential core diagrams, along with matching massing models.

The structural layouts are set up on ideal grid spacings to accomodate a mass timber and CLT structural frame (discussed in section E).

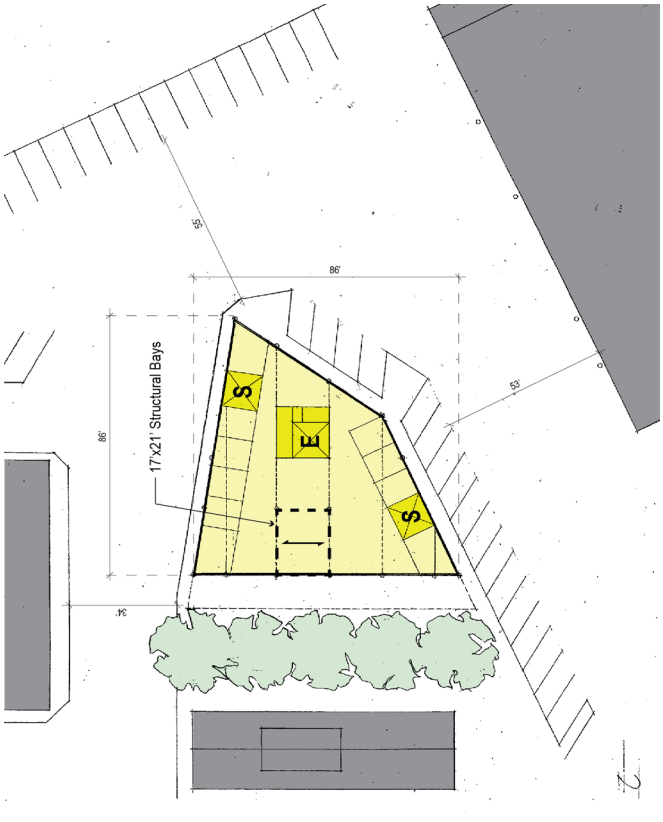
The massing models, per the program, are based on a three story, 4,500 SF footprint. Each level is 11'-8" high, resulting in a roof level at 35'-0", well below the Town's 45' height limit, and just above the eave line of the adjacent fire station. A photovoltaic panel array is suspended no more than 10 feet above the roof by a structural steel supporting frame, allowing space for mechanical units below. In most communities, these panels and frame are exempt from the building height calculation.

The massing based on Concept B2 is is a rectangular form that creates a pinch point between the Proposed Annex and the existing MLP building.

The massing based on C is an irregular form that is more compatible with the orientation of the MLP building, and allows more room for traffic and and parking.

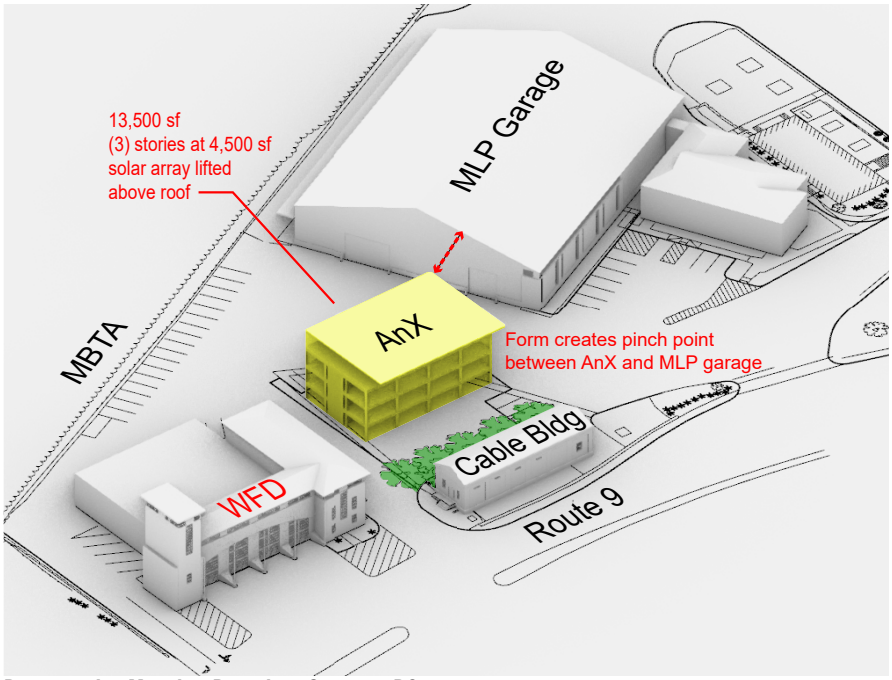


Concept B2 Core and Structure

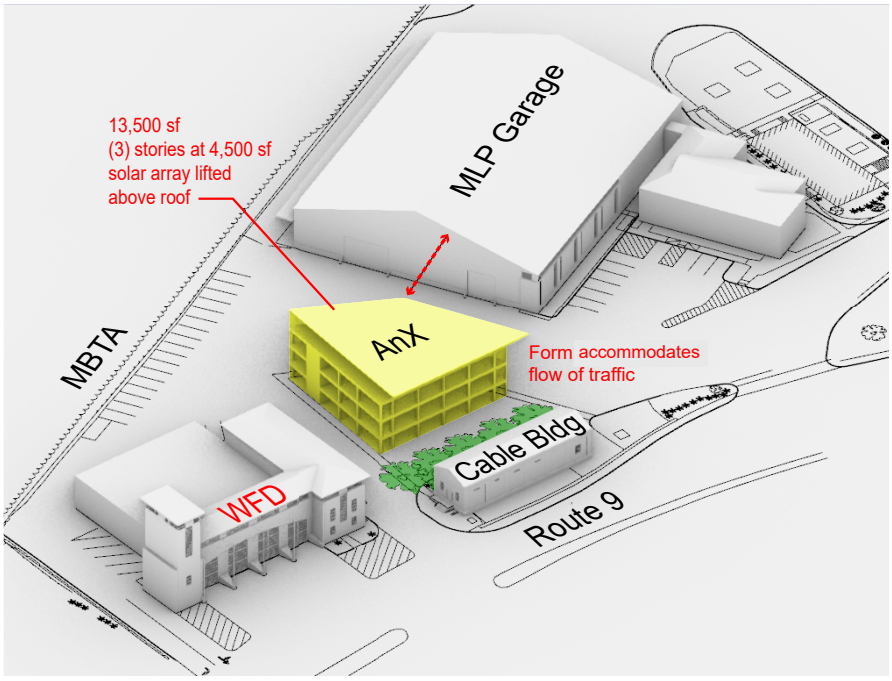


Concept C Core and Structure (preferred)

Initial Site Massing Studies



Rectangular Massing Based on Concept B2



Irregular Massing Based on Concept C (preferred)

Site Stakeholder Input

The Annex Working Group first discussed the project with site stakeholders in October, 2018. As part of this study, SSA and FMD hosted an additional Working Group meeting with these stakeholders to present options for the site design to ensure that the Annex's location does not disrupt the activity on the larger municipal campus. Participants included memebers of the WFD, the MLP, the DPW and the Engineering Department.

SSA presented two options showing the general site circulation concept, along with diagrams of traffic flow for each of the departments, including the Annex (shown on next page).

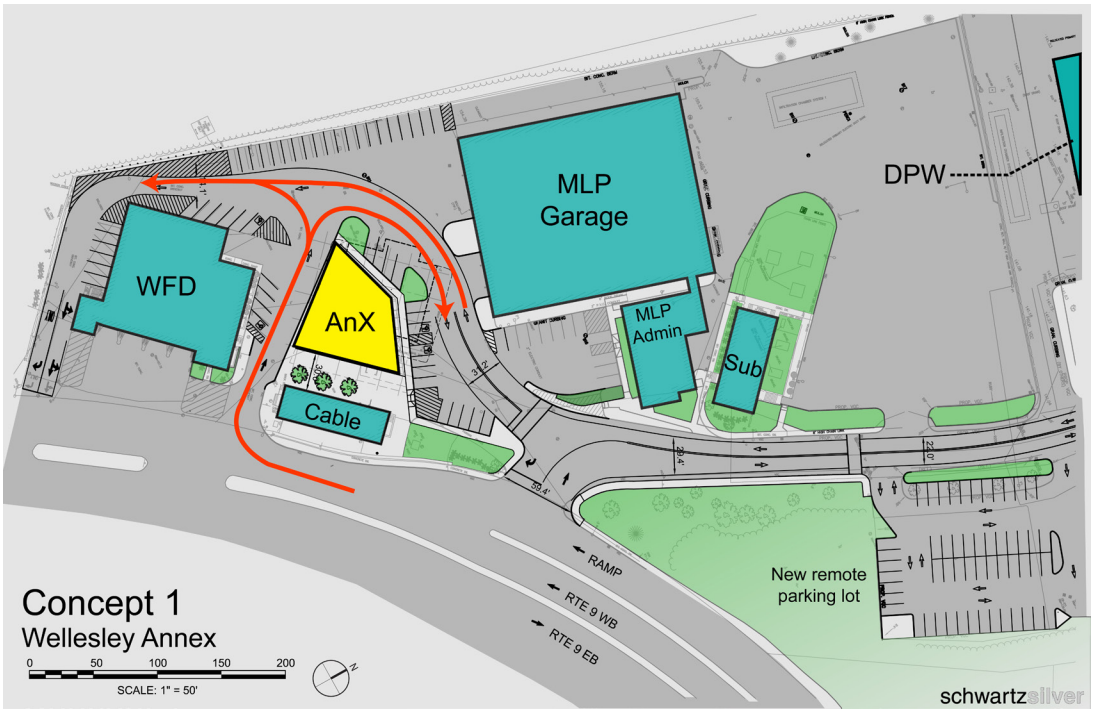
Concept 1 is the peninsula scheme, which allows two way traffic to flow between the MLP and the Annex.

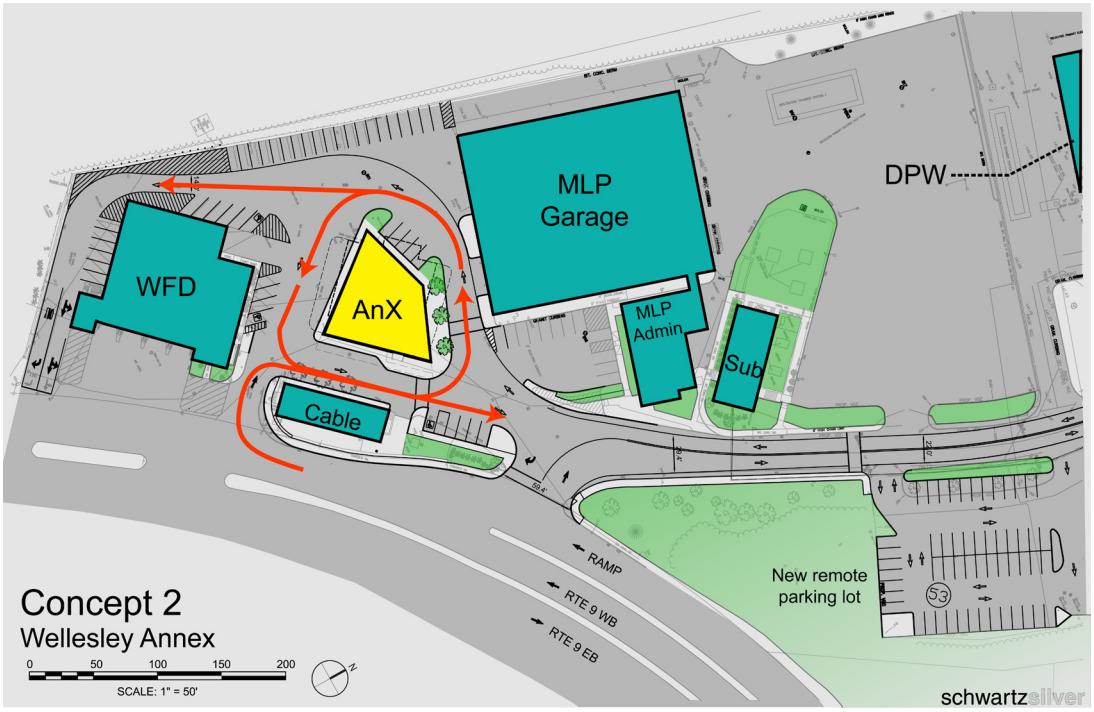
Concept 2 is an island scheme, which allows a one-way flow of traffic around all four sides of the Annex.

Concept 1 was the option preferred by the Working Group as it provides relief from traffic along one side of the Annex. SSA has verified a few specific assurances: the ladder truck can park outside of maintenance bay without impeding traffic; the ladder truck had enough room to back out fo the maintenance bay; and traffic flow is directed away from the MLP overhead doors.

To verify the layout in practice, during the initial stage of schematic design, Concept 1 will be mocked up on-site and tested with stakeholder vehicles to ensure that all departments are comfortable with the proposed solution.

The primary concept diagrams follow. Additional department-specific traffic flow diagrams and vehicle turning diagrams are attached in the appendices.


MLP
Garage
DPW
WFD
AnX
MLP
Admin
Sub
Cable
New remote
parking lot
RAMP
RTE 9 WB
RTE 9 EB
Concept 1
Wellesley Annex
0 50 100 150 200
SCALE: 1" = 50'
schwartzsilver

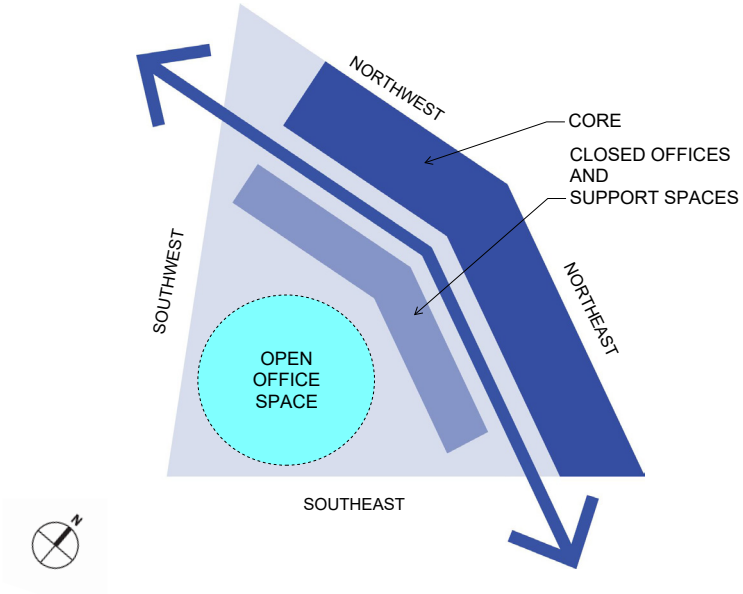

MLP
Garage
DPW
WFD
AnX
MLP
Admin
Sub
Cable
New remote
parking lot
53
RAMP
RTE 9 WB
RTE 9 EB
Concept 2
Wellesley Annex
0 50 100 150 200
SCALE: 1" = 50'
schwartzsilver

Program Test Fit

The program test fit on the preferred Concept 'C' massing is informed initially by Net Zero concepts. Based on the orientation of the facades, it is recommened that there be no closed offices, core, or small rooms along either of the south facing facades to maximize daylighting without stressing mechanical systems.

As a result, the program diagram locates core elements along the north-facing facades, allowing needed open office spaces and public spaces along the south facing facades. In between, closed office and support spaces keep away from exterior walls.

The program approach diagram is as follows:



The conceptual program plans that follow rely on a few concepts:

On a given floor, all workstations are grouped together in one open workspace. This allows for larger open work environments with better daylighting and future flexibility in layouts.

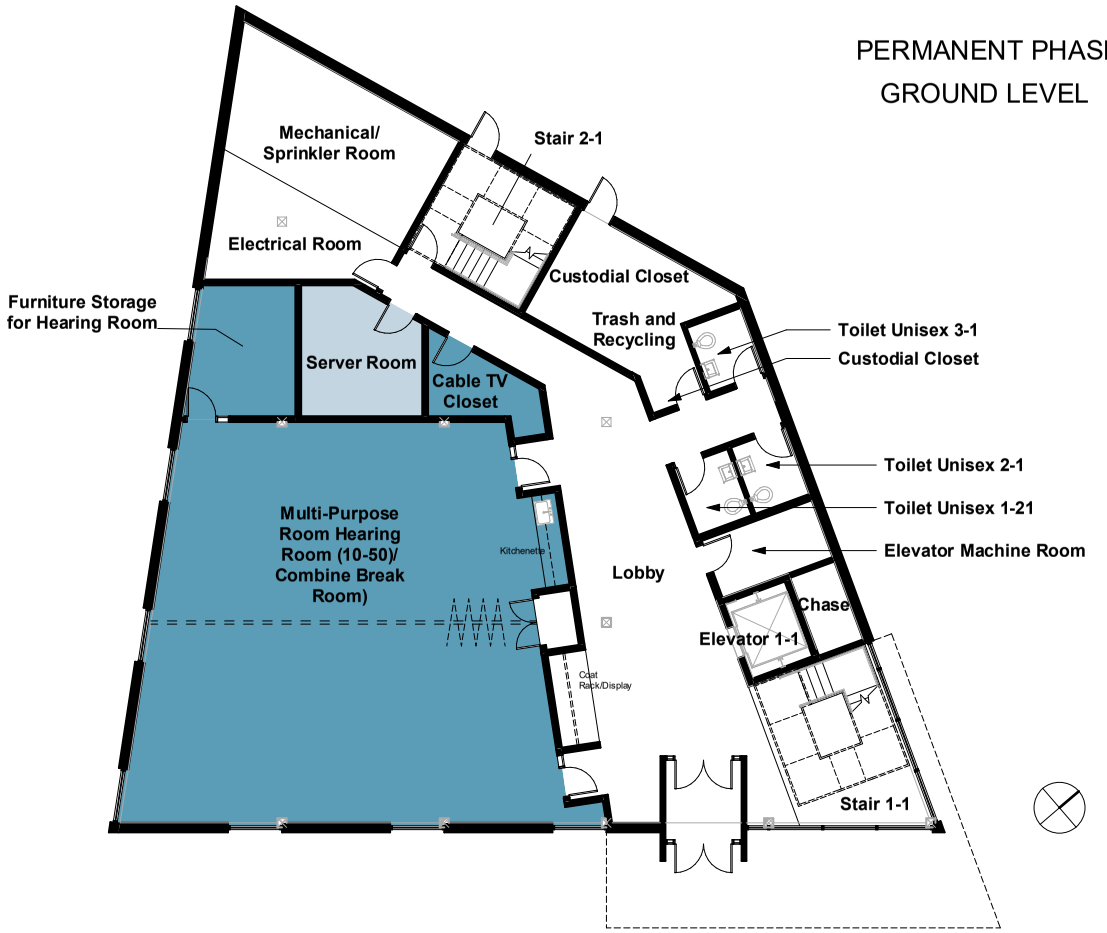
Closed offices are located away from the exterior walls to prevent blocking daylight from the interior, and to avoid overtaxing mechanical systems with small spaces on the south-facing facades.

Resources by floor are shared by multiple departments, including public counters, waiting spaces, copy/print areas, file storage, and open work surfaces.

Department Legend

- Building Core (C)
- General
- Information Technology (IT)

PERMANENT PHASE
GROUND LEVEL



0' 8' 16' 24'
Scale: 3/32" = 1'-0"

SCHWARTZ/SILVER
ARCHITECTS INC.
75 Kneeland Sreet
Boston, Massachusetts 02111
Telephone 617-542-6650
Facsimile 617-951-0779

Town of Wellesley
Wellesley Town Hall Annex

DEPARTMENT PLAN - PERMANENT
PHASE - L1

3/32" = 1'-0"	
Scale	Reference No.
	G2.01
Date	Sketch No.

Department Legend

- Building Core (C)
- Building Department (BD)
- General
- Natural Rsources Commission (NRC)
- Planning Department (PLD)
- Zoning Board of Appeals (ZBA)

PERMANENT PHASE
SECOND LEVEL

SCHWARTZ/SILVER ARCHITECTS INC.
75 Kneeland Sreet
Boston, Massachusetts 02111
Telephone 617-542-6650
Facsimile 617-951-0779

Town of Wellesley
Wellesley Town Hall Annex

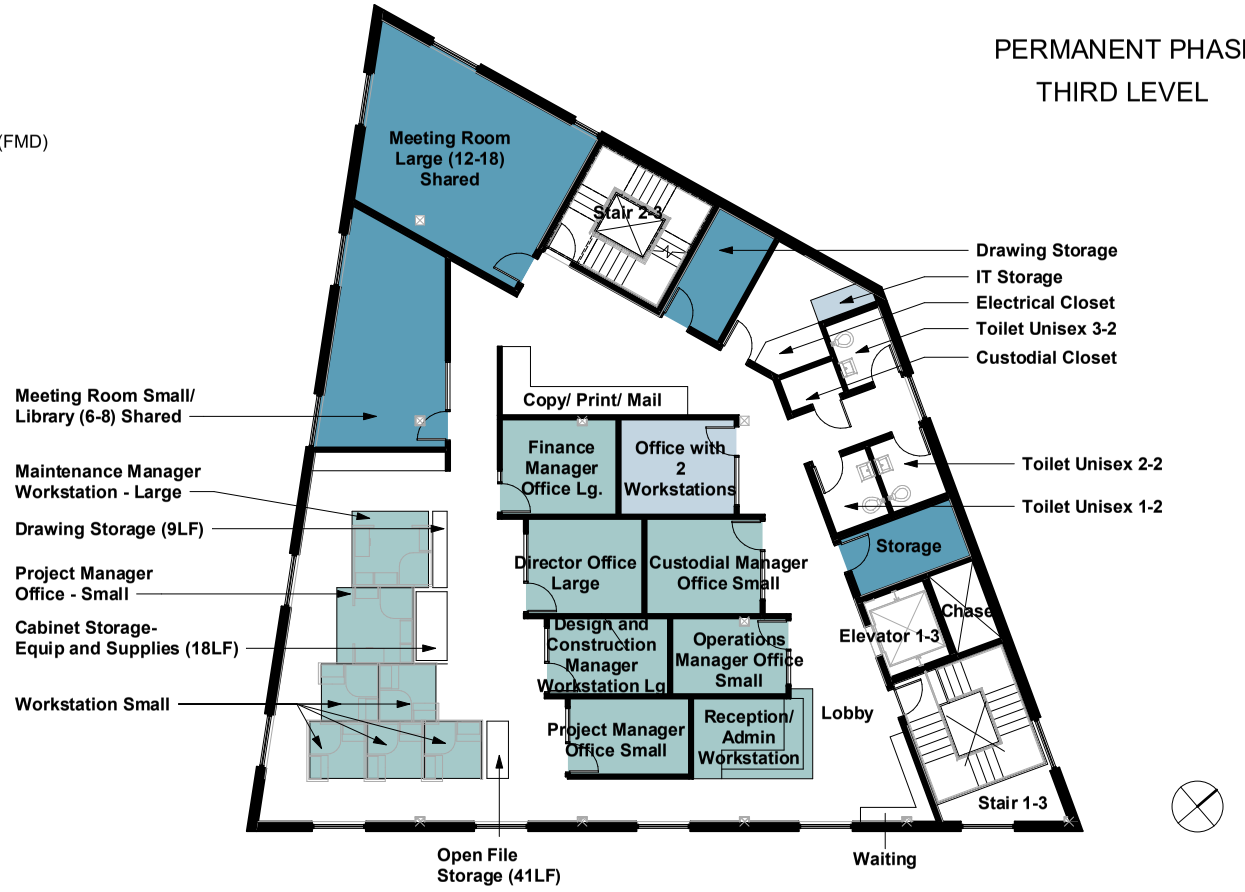
DEPARTMENT PLAN - PERMANENT
PHASE - L2

3/32" = 1'-0"	
Scale	Reference No.
	G2.02
Date	Sketch No.

Department Legend

- Building Core (C)
- Facilities Management Department (FMD)
- General
- Information Technology (IT)

PERMANENT PHASE
THIRD LEVEL



0' 8' 16' 24'
Scale: 3/32" = 1'-0"

SCHWARTZ/SILVER ARCHITECTS INC.
75 Kneeland Sreet
Boston, Massachusetts 02111
Telephone 617-542-6650
Facsimile 617-951-0779

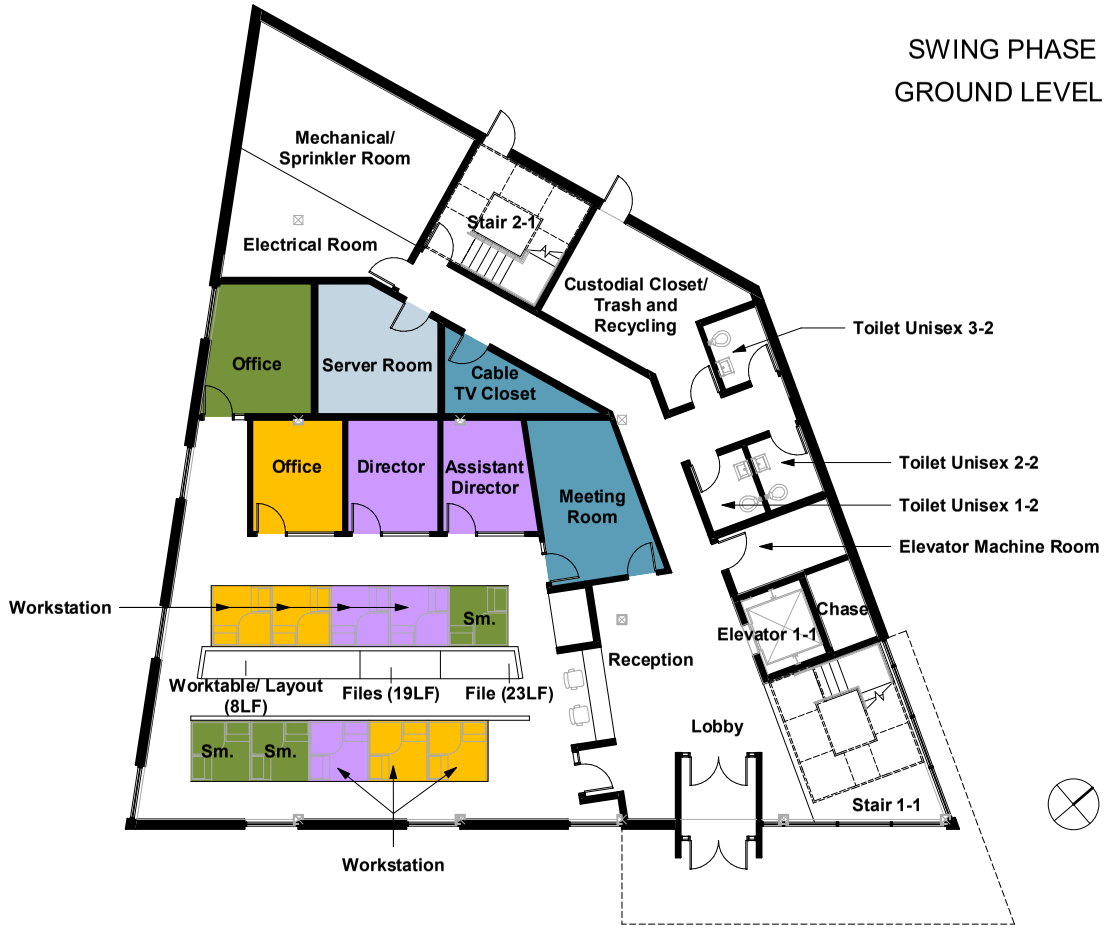
Town of Wellesley
Wellesley Town Hall Annex

DEPARTMENT PLAN - PERMANENT
PHASE - L3

3/32" = 1'-0"	
Scale	Reference No.
	G2.03
Date	Sketch No.

Department Legend

- Assessors Office (AO) Swing
- Building Core (C)
- General
- Information Technology (IT)
- Town Clerk (TC) Swing
- Treasurer/ Collector (TR) Swing



0' 8' 16' 24'
Scale: 3/32" = 1'-0"

SCHWARTZ/SILVER
ARCHITECTS INC.
75 Kneeland Sreet
Boston, Massachusetts 02111
Telephone 617-542-6650
Facsimile 617-951-0779

Town of Wellesley
Wellesley Town Hall Annex

DEPARTMENT PLAN - SWING
PHASE - L1

3/32" = 1'-0"
Scale

Reference No.

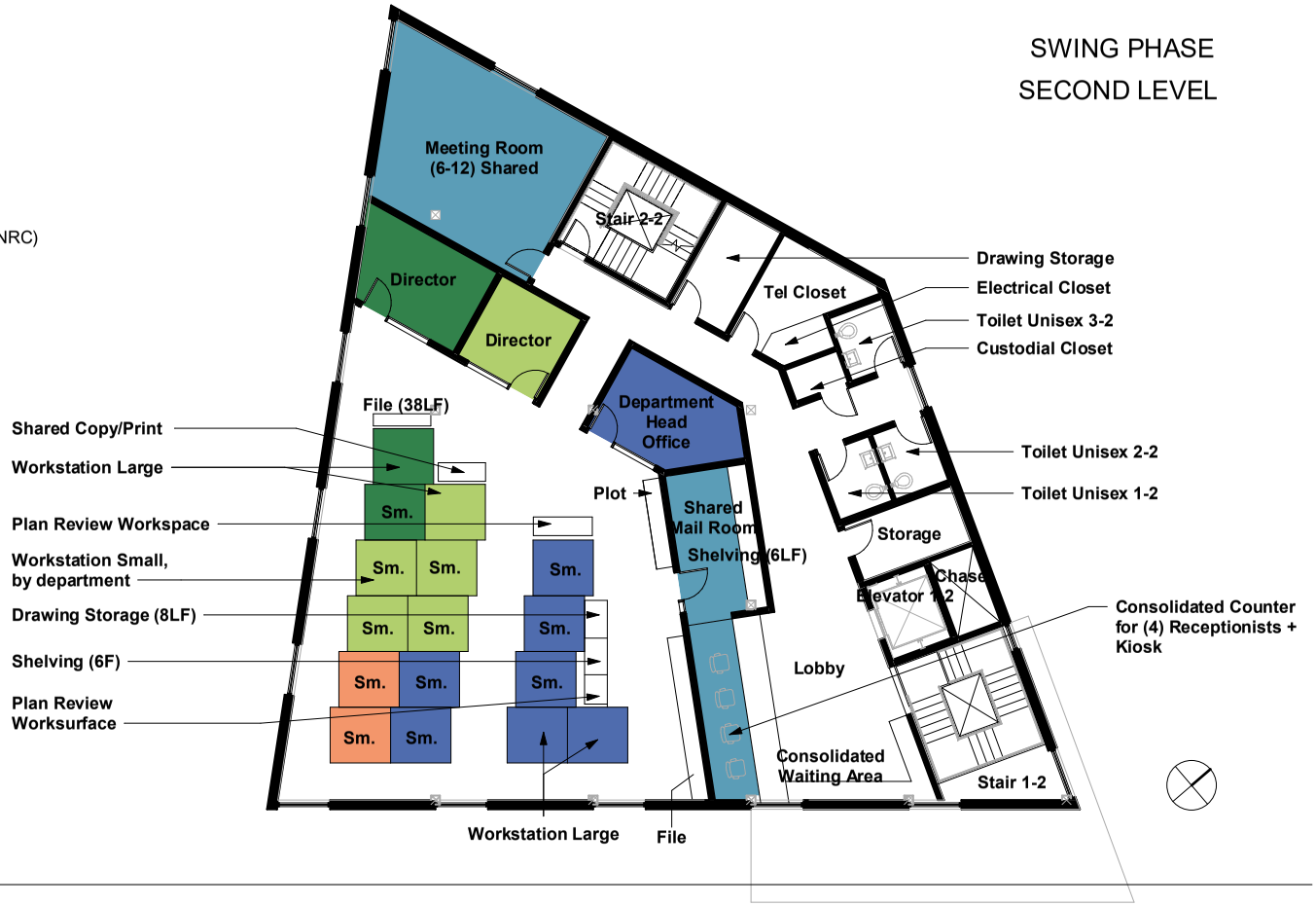
Date

G1.01
Sketch No.

Department Legend

- Building Core (C)
- Building Department (BD)
- General
- Natural Rsources Commission (NRC)
- Planning Department (PLD)
- Zoning Board of Appeals (ZBA)

SWING PHASE
SECOND LEVEL



SCHWARTZ/SILVER ARCHITECTS INC.
75 Kneeland Sreet
Boston, Massachusetts 02111
Telephone 617-542-6650
Facsimile 617-951-0779

Town of Wellesley
Wellesley Town Hall Annex

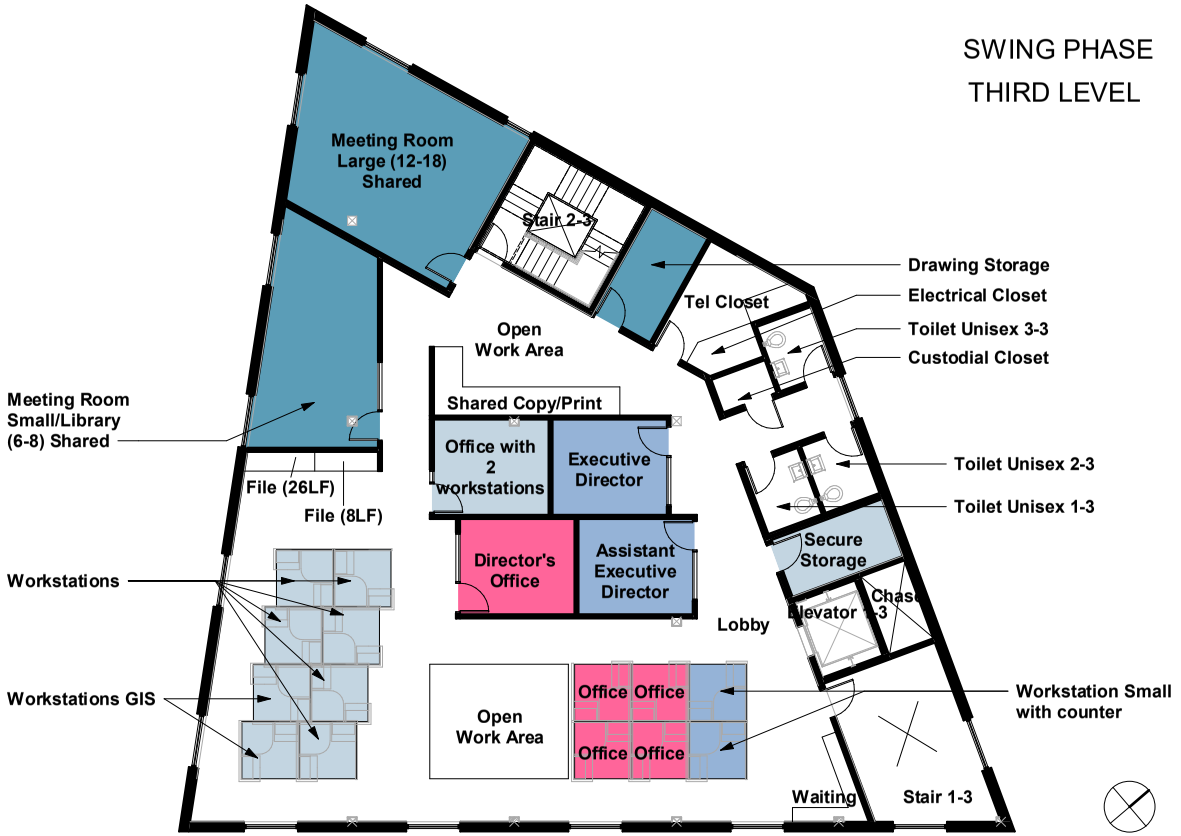
DEPARTMENT PLAN - SWING PHASE - L2

3/32" = 1'-0"	
Scale	Reference No.
	G1.02
Date	Sketch No.

Department Legend

- Building Core (C)
- Finance Department (FN) Swing
- General
- Information Technology (IT)
- Information Technology (IT) Swing
- Selectmen's Office (SO) Swing

SWING PHASE
THIRD LEVEL



0' 8' 16' 24'
Scale: 3/32" = 1'-0"

SCHWARTZ/SILVER
ARCHITECTS INC.
75 Kneeland Sreet
Boston, Massachusetts 02111
Telephone 617-542-6650
Facsimile 617-951-0779

Town of Wellesley
Wellesley Town Hall Annex

DEPARTMENT PLAN - SWING
PHASE - L3

3/32" = 1'-0"	
Scale	Reference No.
	G1.03
Date	Sketch No.

Material and Elevation Concepts

With an eye to a Net Zero Energy building, the facade designs are initally guided by carefully balancing the need for daylight for occupants with the goal of energy conservation. We established target ratios of open to solid surface as follows:

Southeast:	40% Window/ 60% Solid
Southwest:	40% Window/ 60% Solid
Northeast:	25% Window/ 75% Solid
Northwest:	25% Window/ 75% Solid

Meeting the requirement on the north facing facades is easily achieved, as large areas are core elements that are opaque.

On the south-facing facades, an even floor-to-floor rhythm of alternating windows and solid panels maximizes and evenly distributes views and daylight to open work environments and public areas.

For facade materials, we considered a few interchangeable rainscreen systems that would be less energy-intensive than brick, yet still be durable and low maintenance:

Cupaclad: a slate rainscreen
Corrugated Aluminum
Prodema: an engineered wood facade system

Though a slate rainscreen can be fabricated with locally sourced materials, the overall appearance of the building is too cold and dark.

Corrugated Alumimum, when carefully panelized, looks less industrial, and provides a nice surface texture. The material is also inexpensive and recyclable.

Prodema is a low embodied carbon claddding.

The following conceptual model images of the Annex clad the core on the northeast and northwest facades in Prodema panels. The solid panels alternating with windows are clad in corrugated aluminum.

Following the model images are a few images of material precedents.

Conceptual Model Images

Aerial Overview

View to Entry Plaza

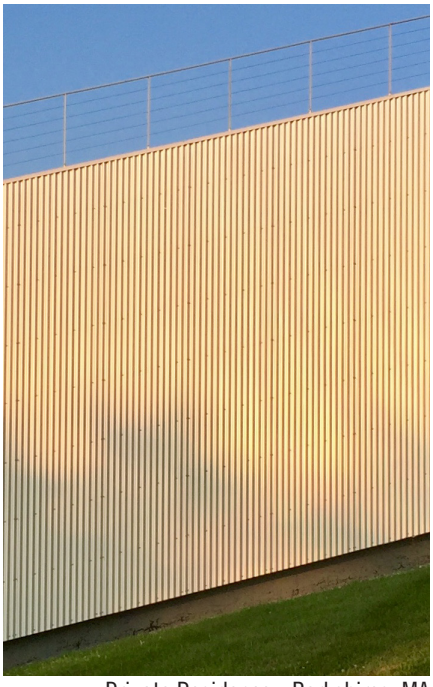
Aerial Overview

View from Back of Site

Material Precedent
Corrugated Aluminum

Speed Art Museum - Louisville, KY

Archeology Museum - Vitoria, Spain

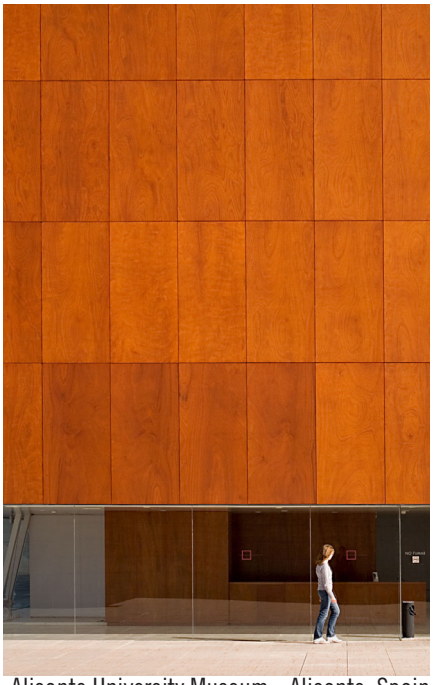


Private Residence - Berkshires, MA

Material Precedent
Prodema

Community Rowing - Brighton, MA

NAtional Forum of Music - Wroclaw, Poland



Alicante University Museum - Alicante, Spain

Sustainability Approach

E

Sustainablity Approach

Net Zero

Beyond studying the feasibility of the site to support the program for the Annex, the Town asked SSA to investigate whether the building could produce all of the energy it will consume within its own footprint, i.e., Net Zero Energy.

The Net Zero concept in a nutshell is to reduce the energy consumption by the building, and then meet that reduced energy demand with photovoltaic panels, ideally within the building's own footprint. This concept guides the design of the Annex in several ways, from broad to specific:

The massing of the building should be a simple stacked form, reducing the surface area of the envelope when compared to building area, and eliminating opportunities for air infiltration. This concept guided the division of the Annex program, for example, into three equal floor plates.

The plan layout is affected by building orientation, with two south-facing facades, and two north-facing facades. Closed offices are best located off the south facades to prevent unnecessary increase of energy load from overheating in small, isolated rooms. Instead, larger spaces such as open, shared work and public spaces line the south facades.

The ratio of window to solid wall area is a balance between providing daylight to the interior and minimizing energy load. The initial conceptual facade was designed to meet these ratios, as discussed in the conceptual design section C.

For the NZ Ready and NZE options, building envelope insulation and air infiltration values are increased base energy code values to help minimize energy load. For conceptual design, this is a pricing exercise. The conceptual cost estimate compares typical envelope values against an uprated envelope to meet Net Zero Energy. Bill Maclay's financial analysis for Net Zero illustrates the incremental costs asssociated with the envelope's construction. This report is included in the appendices. The construction cost of The Net Zero envelope improvement over base is $176,326.

Mechanical system choice for heating and cooling is informed by the goal of Net Zero. An air source electric heat pump system may be more expensive than a conventional gas-fired system, but the long term costs can be offset by eliminting the need to purchase energy. Even if the lifecycle cost is not reduced, the benefits of not consuming fossil fuels remains. The cost estimate compares the electric system to two conventional systems that meet the energy code. Maclay's analysis for Net Zero illustrates the incremental costs asssociated with the system. This report is included in the appendices. The construction cost of the Net Zero VRF system over the base VAV system is an additional $108,000.

The cost analysis also compares Net Zero Ready to Net Zero Energy. The difference is only in

providing the photovoltaic panels to meet the energy load. The energy model confirmed that the building requires a 78kW system, or 260 panels at 300w per panel. This area of panels required can be supported by the building's proposed solid plane of PV panels above the mechanical penthouse. The incremental cost of moving from Net Zero Ready to Net Zero is $499,200.

Incremental Cost Summary (full breakdown in Appendices)

	MA Code VAV	MA Code 4-Pipe	Net Zero Ready ASHP	Net Zero ASHP
Added Envelope	Base	$0	$176,326	$176,326
Added Mechanical	Base	$67,500	$108,000	$108,000
Added PV	Base	n/a	n/a	$499,200
Total Added Cost		**$67,500**	**$284,326**	**$783,526**
Cost per SF		*$5*	*$21*	*$58*

Energy Usage Intensity Comparison

		Mass Code VAV (Base)	Mass Code 4-pipe FCU	Net Zero Ready ASHP	Net Zero ASHP
Electricity	**kBtu/yr**	269000	220000	159000	159000
Electricity-ASHP	**kBtu/yr**	0	0	103000	103000
Fossil Fuels	**kBtu/yr**	442000	269000	0	0
Total Consumed	**kBtu/yr**	712000	489000	263000	263000
Total Produced	**kBtu/yr**				263000
Net Total BuildingEUI	**kBtu/sf-yr**	53	36	19	0
% Better than Base		N/A	32%	64%	100%

CO2 Emmissions Comparison

Envelope + Mechanical Systems	CO2e lbs/yr with no PV	CO2e lbs/yr for PV
Code VAV	187,000	
Code 4-pipe	131,000	
Net Zero Ready, ASHP	85,000	
Net Zero, ASHP		8,500

Mass Timber

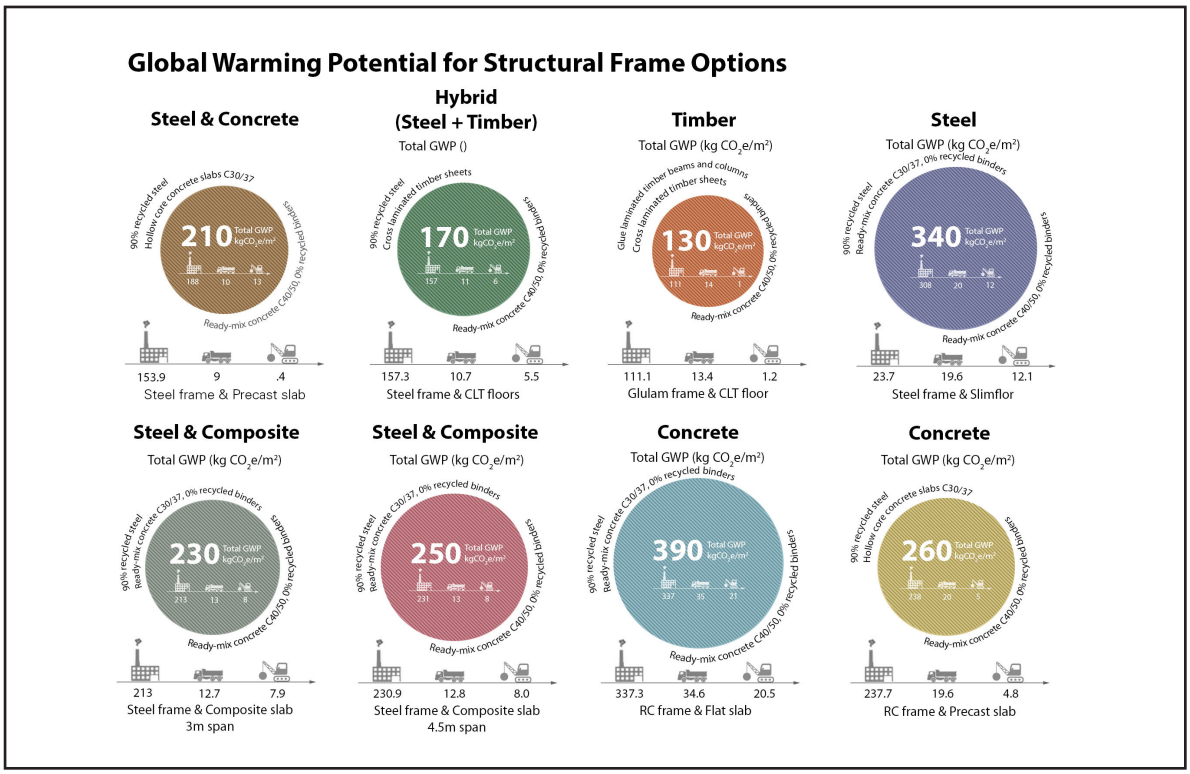
The Annex's other means of consuming less energy is in reducing the embodied carbon of the materials and methods used for putting the building together. Building materials and construction account for eleven percent of global greenhouse gas emissions.

For this reason, SSA and Becker Structural Engineers recommend using a mass timber and cross-laminated timber (CLT) frame to structure the Annex.

Renewable wood sources are part of a cycle of carbon sequestration, where living plants remove and store greenhouse gasses from the atmosphere. Employing this renewable wood structural system could greatly lower the carbon footprint of the building, as the material is not just a carbon neutral, but is carbon negative. It is estimated that wood stores 600 kg of CO_2 for every metric ton of building material created. By comparison steel creates 1900 kg of CO_2 per metric ton; and concrete, 300 kg.

The annex would produce the following CO2 emmissions by structure type:

Concrete	14 kgCO2e
Cross- Laminated Timber	8 kgCO2e
Steel	180 kgCO2e



In addition to the environmental benefits, an exposed wood structure can eliminate the need for additional interior materials, and have a positive effect on occupants. Biophilia is an innate love for the natural world that suggests that interior wood materials can potentially lower blood pressure and decrease cortisol.

Additional advantages of the system are as follows:

A lower structure weight means lower foundation and seismic loads.

Prefabrication means less on-site construction time with smaller crews.

Exposed materials reduce need for other finish materials.

Heavy timber has a natural fire-resistance.

The current building code, IBC 2015, would classify a mass timber Annex as construction type IV-HT (Heavy Timber) which allows exposed structural members, but does not allow concealed spaces like dropped ceilings or soffits. The upcoming IBC 2021 will introduce three new types of construction (Types IV-A, IV-B and IV-C) each with defined fire safety requirements, and allowable heights, areas and number of stories for tall mass timber buildings. In addition IV-HT will be modified to allow concealed spaces. Therefore, we will need further discussion with local building officials regarding future classification.

The Annex's conceptual design has been laid out with the ideal spacing of a mass timber frame. In addition, core elements (stair, elevator, chases) can be constructed with load bearing cross-laminated timber panels. The cost estimate includes this system.

Mass Timber Precedents

Patron's Oxford Insurance - Portland, ME

Albina Yards - Portland, OR

Cost and Schedule

A Conceptual Construction Cost Estimate was prepared by PM&C. The summary sheet follows, with the full estimate in the appendices.

The estimate reflects the proposed sustainability goals of Net Zero Energy and the use of a wood structural frame. Section E on sustainability and the Maclay report provides the incremental costs associated with going from a base-level code building to Net Zero Ready, and then to Net Zero Energy.

$284,326	Code-Level Building to Net Zero Ready
$499,200	Net Zero Ready to Net Zero Energy
$783,526	Total - Code-Level Building to Net Zero Energy

PM&C

Wellesley Town Hall Annex
0
Wellesley, MA

09-Sep-19

Preliminary Design Estimate

MAIN CONSTRUCTION COST SUMMARY

		Gross Floor Area	$/sf	Estimated Construction Cost
NEW ANNEX BUILDING				
NEW BUILDING		13,500	$403.11	$5,441,991
REMOTE PARKING				$340,921
SITEWORK				$761,408
SUB-TOTAL		13,500	$484.76	$6,544,320
ESCALATION - 12 mths	4%			$261,773
DESIGN AND PRICING CONTINGENCY	5%			$327,216
SUB-TOTAL		13,500	$528.39	$7,133,309
GENERAL CONDITIONS	8%			$570,665
BONDS	0.90%			$64,200
INSURANCE	1.50%			$107,000
PERMIT				NIC
OVERHEAD AND FEE	4.0%			$600,339
TOTAL OF ALL CONSTRUCTION		13,500	$627.82	**$8,475,513**

Project Cost Summary

Town Hall Annex

Line Item	Design Budget	Construction
Primary Contractor (Annex)	$ -	$ 8,475,513
Architects/Engineers (Design)	$ 932,306	$ -
Architects/Engineers (Const.)	$ -	$339,021
Presentations	$ 6,000	$ 6,000
Cost Estimates	$ 30,000	$ -
Testing & Inspections	$ -	$ 30,000
Reimbursables	$ 10,000	$ 10,000
Owner's Project Manager	$ 94,000	$ 183,000
Clerk of the Works	$ -	$ 228,000
FF&E Design & Purchase	$ 25,000	$ -
FF&E Budget	$ -	$ 195,750
Moving and Storage	$ -	$ 60,000
Leasing During Construction	$ -	
IT Relocation & Equiptment	$ -	$ 25,000
Cable TV Rework	$ -	$ 90,000
CM @ Risk	$ -	$ -
Commissioning	$ 15,000	$ 30,000
Peer Review	$ 25,000	$ -
Custodial OT Charges	$	$ 5,000
Builder's Risk Insurance	$ -	$ 40,000
FMD Support	$ -	$ 10,000
Bid Docs Online	$ 5,000	$ -
Submittal Exchange	$ 7,000	$ 8,000
PBC Expense	$ 1,000	$ 1,000
Fire Services	$ 1,500	$ 1,500
Legal	$ 6,000	$ 2,000
Printing	$ 1,000	$ -
Hard Cost Contingency	$ -	$847,551
Soft Cost Contingency	$ 102,631	$ 102,631
Sub Totals	$ 1,261,437	$ 10,689,966
Total Cost	$11,951,403	

Project Schedule

Annex

April	2020	Approval of Design Funds
July	2020	Begin Schematic Design
October	2020	Begin Design Development
January	2021	Begin Construction Documents
April	2021	90% Construction Documents
June	2021	Complete CD/Bid Documents
July	2021	Bids Phase Begins
August	2021	Bid Opening
Fall	2021	Approval of Construction Funds @ STM
November	2021	Begin Construction
June	2023	Construction Complete
July	2023	Move into Annex Swing Phase

Town Hall Restoration Project

July	2023	Begin Construction
November	2024	Construction Complete
January	2025	FMD Move into Annex Permanent Phase

75 Kneeland Street
Boston MA 02111

schwartzsilver